In the claims:

Amend the following claims:

1. A method of determination of true nonlinearity of scan along a selected direction X or Y in scan microscope, comprising the steps of orienting a test object on a microscope space so that a direction of strips of periodic pressure is perpendicular to a scanning line; scanning of the test object along the axis X and Y for forming a first two dimensional array of signal value; line by line measuring of pitch values between two strips of a diffraction grating and conversion of a first two dimensional array of signal values into a first two dimensional array of pitch values; averaging of the pitch values along all lines of a frame along a direction perpendicular to the scanning line and converting of the first two dimensional of array of pitch values into a first one dimensional profile of dependence of the average pitch from a coordinate along the scanning line; displacement of the test object along the scanning line by a value of one pitch along or opposite to a probe movement; another scanning of the test object along the axis X and Y for forming a second, displaced array of signal values; line by line measuring of pitch values between two

neighboring strips of the grating and converting of the second two dimensional array of signal values into a second two dimensional array of pitch values; averaging of the pitch values along all lines of the frame along a direction perpendicular to the scanning line and converting the second two dimensional array of pitch values into a second one dimensional profile of dependence of the average pitch of the coordinate along the scanning line;

calculating of a differential nonlinearity of scan along the selected scanning direction in accordance with the expression

$$[DNL(I+1,I)=\pm\{P(I)-P(I)\}]$$

$$\underline{DNL(I)=\pm\{P'(I)-P(I)\}}$$

wherein [DNL(I+1,I)] $\underline{DNL(I)}$ is a differential nonlinearity of scan on a portion of a field of view with number I+1 relative to the portion with number I; P'(I) is an average pitch with number I measured in accordance with the second, shifted one dimensional profile P(I) is an average value of the same pitch with I measured in accordance with the first, initial one dimensional profile, with selecting a plus sign if a displacement was performed along the scanning line and minus sign if the

test object was displaced opposite to the movement of the probe along the scanning line, with I from 1 to N wherein N is a number of fixed pitches along the line of scanning; calculated an integrated nonlinearity along a whole field of view in accordance with the formula

$$[INL(I+1) = \sum_{K=1}^{1} DNU(K)]$$

$$INL(I+1) = \sum_{k=1}^{I} DNL(k)$$

wherein INL(I+1) is an integral nonlinearity of scan on the portion of the field of view with number I+1; DNL(k) is a differential nonlinearity on the portion of the field of view with the number k, and performing summation on all portions on the field of view preceding the portion with number I+1; calculating a differential non uniformity of the test object in accordance with the expressions [DNU(I,J)=± {P(I)-P'(J)}] DNU(I)=± {P(I)-P'(J)} and [I=J+] I=J±1, wherein [DNU(I,J)] DNU(I) is a differential non uniformity of the pitch of test object on the portion between the pitch with a number I and the pitch with the number J; P(I) is an average pitch with the number I in the first, initial one dimensional profile; P'(J) is an average pitch with the number J on the second, shifted one dimensional profile, with selection of

a plus sign when the displacement was performed along the displacement of the probe and the minus sign where the displacement was performed in an opposite direction; and calculation of an integrated non uniformity of the test object in accordance with the formula

$$[P(I+1) - P(I) + \sum_{K=1}^{1} DNU(K)]$$

$$P(I+1) = P(1) + \sum_{k=1}^{I} DNU(k)$$

where P(I+1) is a corrected, true value of the pitch with number [I=1] I+1; P(1) is a base value of the pitch with number 1; and performing [assumation] summation on all pitches preceding the pitch with the number I+1.

5. A method of determination of true nonlinearity of scan along the selected direction X or Y in scan microscope, comprising the steps of orienting the test object on a microscope stage so that a direction of strips of pitch structure is perpendicular to a scanning line, scanning of the test object along the axis X and Y for forming a first two dimensional array of signal values; line by line measuring of pitch value between two selected neighboring strips of a grating and conversion of a first two

dimensional array of signal values into a first one dimensional array of line by line pitch values between selected strips; averaging of pitch values along all lines of a one dimensional array by calculating a first average value of the pitch between the selected pair of strips; displacing of the test object on the microscope stage in direction of displacement of a probe or in an opposite direction by a fixed distance δX; another scanning of the test object along the axis X and Y for forming a second two dimensional array of signal values; line by line measuring of pitch values between same two selected neighboring strips of the grating and converting of a second two dimensional array of signal values into a second one dimensional array of line by line pitch values between the selected strips; averaging of pitch values along all lines of one dimensional array by calculating a second average value of a pitch between the selected pair of strips; calculating of differential nonlinearity of line scan on a portion of a field of view between two positions X and $X+\delta X$ of the selected pair of strips according to the equation

$$DNL(X + \delta X, X) = P'-P$$

wherein $DNL(X+\delta X,X)$ is a differential scan non-linearity, P' is a pitch measured on a shifted image, and P is a pitch measured on original, non-shifted image;

another multiple displacement of the test object and repeated scanning of the test object for forming the second two dimensional array of signal values, with displacement of image of the selected pair of lines along all field of view of the microscope; and calculating an integrated nonlinearity of the line scan in accordance with the formula

$$[INL(X = \Sigma\, \delta X) = \sum_{k=1}^{I} DNL(K),]$$

$$\underline{\mathrm{INL}(X = \Sigma\, \delta X) = \sum_{k=1}^{I} \mathrm{DNL}(k),}$$

wherein DNL(k) is a differential non-linearity on a portion of a field of view with number k, INL(X=Σ δX) is an integrated nonlinearity of scan on the portion with X coordinate equal to a sum of all performed displacements X = Σ δX, and summing in accordance with a number of displacement of the test object in the field of view of the microscope.

Amended claims:

1. A method of determination of true nonlinearity of scan along a selected direction X or Y in scan microscope, comprising the steps of orienting a test object on a microscope space so that a direction of strips of periodic pressure is perpendicular to a scanning line; scanning of the test object along the axis X and Y for forming a first two dimensional array of signal value; line by line measuring of pitch values between two strips of a diffraction grating and conversion of a first two dimensional array of signal values into a first two dimensional array of pitch values; averaging of the pitch values along all lines of a frame along a direction perpendicular to the scanning line and converting of the first two dimensional of array of pitch values into a first one dimensional profile of dependence of the average pitch from a coordinate along the scanning line; displacement of the test object along the scanning line by a value of one pitch along or opposite to a probe movement; another scanning of the test object along the axis X and Y for forming a second, displaced array of signal values; line by line measuring of pitch values between two neighboring strips of the grating and converting of the second two dimensional array of signal values into a second two dimensional array of

32

pitch values; averaging of the pitch values along all lines of the frame along a direction perpendicular to the scanning line and converting the second two dimensional array of pitch values into a second one dimensional profile of dependence of the average pitch of the coordinate along the scanning line;

calculating of a differential nonlinearity of scan along the selected scanning direction in accordance with the expression

$$DNL(l)=\pm\{P'(l)-P(l)\}$$

wherein DNL (l) is a differential nonlinearity of scan on a portion of a field of view with number l+1 relative to the portion with number l; P'(l) is an average pitch with number l measured in accordance with the second, shifted one dimensional profile P(l) is an average value of the same pitch with l measured in accordance with the first, initial one dimensional profile, with selecting a plus sign if a displacement was performed along the scanning line and minus sign if the test object was displaced opposite to the movement of the probe along the scanning line, with l from 1 to N wherein N is a number of fixed pitches along the line of scanning; calculated an integrated nonlinearity along a whole field of view

in accordance with the formula

$$INL(I+1) = \sum_{k=1}^{I} DNL(k),$$

wherein INL(I+1) is an integral nonlinearity of scan on the portion of the field of view with number I+1; DNL(k) is a differential nonlinearity on the portion of the field of view with the number k, and performing summation on all portions on the field of view preceding the portion with number I+1; calculating a differential non uniformity of the test object in accordance with the expressions DNU(I,J)=± {P(I)-P'(J)} and I=J±1 , wherein DNU(I,J) is a differential non uniformity of the pitch of test object on the portion between the pitch with a number I and the pitch with the number J; P(I) is an average pitch with the number I in the first, initial one dimensional profile; P'(J) is an average pitch with the number J on the second, shifted one dimensional profile, with selection of a plus sign when the displacement was performed along the displacement of the probe and the minus sign where the displacement was performed in an opposite direction; and calculation of an integrated non uniformity of the test object in accordance with the formula

$$P(I+1) = P(1) + \sum_{k=1}^{I} DNU(k),$$

where I=J+1 is a corrected, true value of the pitch with number I+1; P(1)- is a base value of the pitch with number 1; and performing summation on all pitches preceding the pitch with the number I+1.

5. A method of determination of true nonlinearity of scan along the selected direction X or Y in scan microscope, comprising the steps of orienting the test object on a microscope stage so that a direction of strips of pitch structure is perpendicular to a scanning line, scanning of the test object along the axis X and Y for forming a first two dimensional array of signal values; line by line measuring of pitch value between two selected neighboring strips of a grating and conversion of a first two dimensional array of signal values into a first one dimensional array of line by line pitch values between selected strips; averaging of pitch values along all lines of a one dimensional array by calculating a first average value of the pitch between the selected pair of strips; displacing of the test object on the microscope stage in direction of displacement of a probe or in an opposite direction by a fixed distance δX; another scanning of the test object along the axis X and Y for forming a second two dimensional array of signal values; line by line measuring of pitch values between

same two selected neighboring strips of the grating and converting of a second two dimensional array of signal values into a second one dimensional array of line by line pitch values between the selected strips; averaging of pitch values along all lines of one dimensional array by calculating a second average value of a pitch between the selected pair of strips; calculating of differential nonlinearity of line scan on a portion of a field of view between two positions X and X+δX of the selected pair of strips according to the equation

$$DNL(X+\delta X,X)=P'-P$$

wherein DNL(X+δX, X) is a differential scan non-linearity, P' is a pitch measured on a shifted image, and P is a pitch measured on original, non-shifted image

another multiple displacement of the test object and repeated scanning of the test object for forming the second two dimensional array of signal values, with displacement of image of the selected pair of lines along all field of view of the microscope; and calculating an integrated nonlinearity of the line scan in accordance with the formula

$$INL(X = \Sigma\delta X) = \sum_{k=1}^{l} DNL(k),$$

wherein DNL(k) is a differential non-linearity on a portion of a field of view with number k, INL(X=Σ δX) is an integrated nonlinearity of scan on the portion with X coordinate equal to a sum of all performed displacements X = Σ δX, and summing in accordance with a number of displacement of the test object in the field of view of the microscope.

37